Patent claims

1. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) for producing a paint spray mist for painting a workpiece, with a sonotrode (12, 48), with a component (14) arranged lying opposite the sonotrode (12, 48), a standing ultrasonic field being formed in the intermediate space between the sonotrode (12, 48) and the component (14) in the case of operation, and with a paint-feeding device (29), by means of which paint can be fed into the vicinity of a maximum of the sound particle velocity of the ultrasonic field, characterized in that the paint-feeding device (29) has in the region of the standing ultrasonic field at least two pieces of pipe (30, 31, 32; 42, 43, 44) for discharging paint, and in that at least two of the pieces of pipe (30, 31, 32; 42, 43, 44) are arranged in the region of a selected maximum of the sound particle velocity of the standing ultrasonic field.

2. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to Claim 1, characterized in that the component (14) is a further sonotrode.

3. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to Claim 1 or 2, characterized in that the distance between the pieces of pipe (30, 31, 32; 42, 43, 44) in the region of the selected maximum is so great that sheets of paint that are separate from one another are formed for each piece of pipe (30, 31, 32; 42, 43, 44).

4. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to one of the preceding claims, characterized in that the paint outlet openings of the at least two pieces of pipe (30, 31, 32; 42, 43, 44) in the region of the selected maximum of the sound particle velocity of a standing ultrasonic wave are arranged on an imaginary straight line, and in that the straight line is perpendicular to an imaginary centre line which passes through the centroids of the opposing sound faces (20, 22, 56, 58) of the sonotrode (12, 48) and of the component (14, 46).

5. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to Claim 4, characterized in that the shape of the sound faces (66, 68) corresponds approximately to a segment of the generated surface of a cylinder reproduced with polyhedral surfaces, or the segment is cylindrical, and in that the longitudinal axis of the cylinder concerned is situated parallel to the straight line (24, 26, 62).

6. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to one of the preceding Claims 1 to 3, characterized in that three of the pieces of pipe (30, 31, 32; 42, 43, 44) are arranged in the region of a selected maximum of the sound particle velocity of a standing ultrasonic wave, and in that these pieces of pipe (30, 31, 32; 42, 43, 44) or their paint outlet openings are arranged in a triangle, in particular an equilateral triangle.

7. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to Claim 6, characterized in that the surface which is

determined by the triangle is perpendicular to an imaginary centre line which passes through the centroids of the opposing sound faces (20, 22, 56, 58, 66, 68) of the sonotrode (12, 48) and of the component (14, 46).

8. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to one of the preceding claims, characterized in that the distance between the at least two pieces of pipe (30, 31, 32; 42, 43, 44) arranged in the region of a selected maximum of the sound particle velocity of a standing ultrasonic wave and the sonotrode (12, 48) is at most equal to the distance between these pieces of pipe (30, 31, 32; 42, 43, 44) and the component (14, 46).

9. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to one of the preceding claims, characterized in that the at least two pieces of pipe (30, 31, 32; 42, 43, 44) are provided with a hydrophobic surface, in particular a tetrafluoroethylene coating.

10. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to one of the preceding claims, characterized in that there is a flow of cleaning air, by which wetting of the sonotrode (12, 48) and/or of the component (14, 46) is avoided or reduced.

11. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to one of the preceding claims, characterized in that there is a flow of directing air, by which the direction of flight of the paint spray mist can be influenced.

12. Ultrasonic standing-wave atomizer arrangement (10, 40, 50, 60, 70, 80) according to one of the preceding claims, characterized in that there is at least one charging device for internal and/or external charging, by which the paint or the atomized paint particles can be electrostatically charged.